COMMUNITY AFFAIRS

Division Of Codes And Standards
Carnival-Amusement Rides
Design and Construction; Referenced standards; Applications
Proposed Amendments: N.J.A.C. 5:14A-1.2, 1.3, 2.4 through 2.7, 2.10 through 2.12, 4.2, 5.2, 5.4, 7.1, 9.4, 9.15, 9.17, 9.19 and 9.23
Proposed New Rules: N.J.A.C. 5:14A-7.2 and 7.7
Proposed Recodifications: N.J.A.C. 7.12 as 7.3, 7.14 as 7.4, 7.15 as 7.5, 7.16 as 7.6, 7.33 as 7.8 and 7.35 as 7.9
Proposed Repeals: N.J.A.C. 5:14A-7.2 through 7.11, 7.13, 7.17 through 7.32, 7.34, 7.36 and 7.37

Authorized By: Susan Bass Levin, Commissioner, Department of Community Affairs.
Authority: N.J.S.A. 5:3-36.
Calendar Reference: See Summary below for explanation of exception to calendar requirement.
Proposal Number: PRN 2006-

_____
SUSAN BASS LEVIN, Commissioner

Submit written comments by July 14, 2006 to:

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The agency proposal follows:

Summary

This proposal is an adoption by reference, with amendments, of a national standard for the design of amusement rides and devices. The standard is the American Society of Testing and Material F2291-04, *Practice for Design of Amusement Rides and Devices*. In 2002, the Department incorporated the yet unpublished text of F-2291-04 into subchapter 7 of N.J.A.C. 5:14A. Now that F-2291-04 has been published and can therefore be adopted by reference, N.J.A.C. 5:14A is proposed to be amended to include an adoption by reference of F-2291-04, with the New Jersey amendments indicated in the text of N.J.A.C. 5:14A.

This proposal includes the following changes:

1. N.J.A.C. 5:14A-1.2 would be revised to reflect definitions that are now in the standard;

2. N.J.A.C. 5:14A-1.3 would be revised to reflect the specific national and international standard that the Department will adopt pursuant to those contained in F-2291-04;

3. N.J.A.C. 5:14A-7 would be completely revised and modified in order to adopt F-2291-04 with amendments

4. Other miscellaneous changes would correlate the clarification of "modification" and change references throughout the text in accordance with the changes in Subchapter 7.

The proposed amendments to F-2291-04 would be neutral in that most provisions of the current N.J.A.C. 5:14A-7.1 though 7.6 would be adopted by reference, rather than be in the text. The text will continue to include those provisions that modify or differ from the referenced standard.

This proposal would also require that all out of state participants in the Carnival and Amusement Ride Safety Program have an address of record within the state of New Jersey for official service. Any company or individual doing business in New Jersey as an out-of-state entity is required to have a registered agent. This amendment to the regulations would make this registered agent a requirement for the application and annual permit process.

As the Department has provided a 60-day comment period for this notice of proposal, this notice is excepted from the rulemaking calendar requirements, pursuant to N.J.A.C. 1:30-3-3(a)5.

Social Impact

The proposed amendment would have a positive social impact because to would allow for the use of a national standard and provide the industry with a clear understanding of the current rules by making clear the differences between F-2291-04 and New Jersey requirements and because it would allow the Department to more effectively regulate out-of-state entities on equal terms with in-state entities.

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Economic Impact

The would be no economic impact on regulated parties because the substantive requirements of the proposed amendments are already in effect and because entities that would be subject to the new requirement to provide the name and address of an in-state agent are already required to have an in-state agent in order to do business in New Jersey.

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Federal Standards Statement

No Federal standards analysis is required because these amendments is not being proposed in order to implement, comply with, or participate in any program established under Federal law or under a State law that incorporates or refer to Federal law, standards, or requirements.

Jobs Impact

The Department does not anticipate that the proposal would result in the creation or the loss of jobs.

Agricultural Industry Impact

The proposed amendments would not impact the agricultural industry

Regulatory Flexibility Analysis

Since this proposal would not make any actual changes in the regulation of the design and construction of carnival-amusement rides, it would not impose any recordkeeping or compliance requirements upon any "small businesses," as defined in the New Jersey Regulatory Flexibility Act, N.J.S.A. 52:14B-16 et seq. The only reporting requirement that would be imposed would be of minimal impact, since it would only require inclusion of information already required to be provided to another State agency.

Smart Growth

Adoption of the proposed amendments would not have any consequences for the achievement of "smart growth" or the implementation of the State Development and Redevelopment Plan.

Full text of the proposal follows (additions indicated in boldface **thus**; deletions indicated in brackets [thus]).

5:14A-1.2 Definitions

The following words and terms, when used in this chapter, shall have the following meanings**,** unless the context clearly indicates otherwise or the term is redefined for a specific section or purpose:

…

["Acceleration, impact" means those accelerations with duration of less than 200 milliseconds (msec).

"Acceleration, sustained" means those accelerations with duration greater than 200 msec.]

….

["Automatic mode" means the ability, after initialization, of the amusement ride or device to start, operate, move, etc. with limited or no operator intervention.]

["Closed" means, when used in reference to restraint devices, the position in which the restraint is intended to remain during the operation of the ride or device in order to restrain the patron(s).]

…

["Containment" means the features in an amusement ride or device that accommodate the patron for the purpose of riding the ride or device. This may include, but is not limited to, the seats, side walls, walls or bulkheads ahead of the rider(s), floors, objects within the vicinity of the rider(s), restraint systems and cages.]

….

["Electrical (E)/Electronic (E)/Programmable Electronic Systems (PES) (E/E/PES)" means the following. "Electrical" refers to logic functions performed by electromechanical techniques (for example, electromechanical relay, motor driven timers, etc.); "electronic" refers to logic functions performed by electronic techniques (for example, solid state logic, solid state relay, etc.); and "programmable electronic system" refers to logic performed by programmable or configurable devices (for

example,Programmable Logic Controller (PLC)). Field devices are not included in E/E/PES.

"Electro-sensitive protective equipment (ESPE)" means an assembly of devices or components working together for protective tripping or presence-sensing purposes.

"Emergency stop (e-stop)" means a shut down sequence(s), other than a normal stop, that brings the ride or device to a stop.]

….

["Fail-safe" means the characteristic of an amusement ride or component thereof that is designed in such a way that the normal and expected failure mode results in a safe condition.

"Fence" means a type of barrier consisting of, but not limited to, posts, boards, wire, stakes, or rails that is used to inhibit patrons from coming into undesirable contact with the moving portion or restricted portion of an amusement ride or device.**]**

"Fixed amusement ride" or "Fixed ride" means an amusement ride that is designed to resists all applicable environmental loads for its intended location and is located at a fixed location. This definition also means and includes all amusement rides that are not mobile rides.

"Fixed location" or "Fixed site" means a location where an amusement ride is sited for operation with permanent foundations, electrical, and plumbing, as required.

….

["Force limiting" means, when used in reference to restraint devices, a characteristic that, regardless of the amount of force available from the system actuators, limits the amount of force applied to the patron(s).

"Gate" means a section of fencing that may be opened.]

….

["Guardrail" means a system of building components located near the open sides of elevated walking surfaces for the purpose of minimizing the possibility of an accidental fall from the walking surface to the lower level.

"Hand mode" means the ability of the amusement ride or device to start, operate, move, etc. only with operator intervention.

"Handrail" means railing provided for grasping with the hand for support.]

….

["Latched" means held securely against opening except by intentional action of the rider, operator or other means.]

…..

["Locked" means held securely against opening except by intentional action of the operator or other means, not accessible by the rider.]

….

["Manual release" means a hand or foot operated mechanism that allows for opening the rider restraint.]

….

"Mobile ride" or "Portable amusement ride" means an amusement ride that may not be designed to resist all applicable environmental loads for its intended location, generally does not require a foundation or footing, and is designed and constructed to be readily racked and transported from one site to another.

["Modification" or "alteration"] **"Major modification**" means any material change to a load-bearing structural member, a mechanical, electrical, hydraulic or pneumatic drive or control feature, or a restraint or other protective feature.

…

["Primary circulation area" means an area leading directly to the entrance or exit of a ride that is normally traveled by patrons. These areas would not include emergency exit routes, maintenance areas, or other areas not normally on the route of the patron.]

....

["Restraint" means the system, device or characteristic that is intended to inhibit or restrict the movement of the patron(s).**]**

….

["Safety-related control system" means the hardware and software that controls the safety functions and components of the amusement ride or device as defined by the ride analysis.**]**

5:14A-1.3 Standards adopted

(a) The standards listed below are adopted and incorporated as part of this chapter. In the event that any provision in any of the following standards conflicts with a provision of this chapter, this chapter shall govern.

1. The following standards are adopted and are available from the American Concrete Institute, P.O. Box 19150, Detroit, Michigan 48219:

i. ((No change.).)

ii. ACI 318-[95] **02**, "Building Code Requirements for Reinforced Concrete"

2. [AISC, "Manual of Steel Construction ASD, 9th Edition," is adopted and is] **The following standards are adopted and are** available from the **American Institute of Steel Construction, 400 North Michigan Ave., Chicago, Illinois 60611;**

i. AISC, "Manual of Steel Construction ASD, 9th Edition;

ii. AISC 316 (1989) Manual on Steel Construction, Allowable Stress Design (ASD);

iii. AISC M015 (1986) Manual on Steel Construction, Load and Resistance Factor Design (LRFD)

3. The following standards are adopted and are available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036:

i. ANSI B11.TR3 **(2000)**, "Technical Report on Risk Assessment and Reduction";

ii.- iii. ((No change.).)

iv ANSI B93.114M (1987) Pneumatic Fluid Power - System Standard for Industrial Machinery

4. **[**ASCE 7 – 98, "Minimum Design Loads for Buildings and Other Structures," is adopted and is available from the**]** **The following standards are adopted and are available from the American Society of Civil Engineers, 1801 Alexander Bell Drive, Reston, Virginia 20191-4400;**

i. ASCE 7 (1998), Minimum Design Loads for Buildings and Other Structures,

ii. ASCE 16 (1995) Standard for Load and Resistance Factor Design (LRFD) for Engineered Wood Construction

5. The following standards are adopted and are available from the American Society for Testing and Materials, 100 Barr Harbor Drive, P.O. Box C700, W. Conshohocken, PA 19428-2959:

i.- v. ((No change.).)

vi. ASTM F 853-[98] **04**, "Practice for Maintenance Procedures for Amusement Rides and Devices";

vii. ASTM F 893-[87] **04**, "Guide for Inspection of Amusement Rides and Devices";

viii. ASTM F 1159-[97a, "Standard Practice for the Design and Manufacture of Amusement Rides and Devices"] **03a, "Practice for Design and Manufacture of Patron Directed, Artificial Climbing Walls, Dry Slide, Coin Operated and Purposeful Water Immersion Amusement Rides and Devices and Air-Supported Structures";**

ix. ASTM F 1193-[97, "Practice for an Amusement Ride and Device Manufacturer Quality Assurance Program'] **04, "Practice for Amusement Ride and Device Manufacturer Quality Assurance Program and Manufacturing Requirements"**;

x. ASTM F 1918 **–98**, "Standard Safety Performance Specification for Soft Contained Play Equipment;

xii. ASTM F 2007-00, "Practice for the Classification, Design, Manufacture, and Operation of Concession Go Karts and Facilities"; [and]

xiii. ASTM F 2137-01, "**Practice for** Measuring the Dynamic Characteristics of Amusement Rides and Devices";

xiv. ASTM F 1305-94, "Guide for the Classification of Amusement Ride and Device Related Injuries and Illnesses";

xv. ASTM F 1950-99, "Specifications for Physical Information to be Transferred with Used Amusement Rides and Devices";

xvi. ASTM F 2291-04, "Practice for Design of Amusement Rides and Devices";

xvii. ASTM F 2374-04, "Practice for Design, Manufacture, Operation, and Maintenance of Inflatable Amusement Devices".

xviii. MIL-STD-17 (2000) The Composite Material Handbook

xix Mil-STD-882C (1993) System Safety Program Requirements

xx. STP-1330 Composite Materials: Fatigue and Fracture, 7th Volume

6. **The following standards are adopted and are** [AWS D1.1, "Design of Welded Structures (Steel)," is adopted and is]available from the American Welding Society, 550 N.W. LeJeune Road, Miami, Florida 33126**:**

i. ANSI/AWS D1.1/D1.1M (2002) Structural Welding Code – Steel

ii. ANSI/AWS D14.4 (1997) Specification for Welded Joints in Machinery and Equipment

7.- 8. ((No change.).)

9. The following standards are adopted and are available from the European Committee for Standardization, Central Secretariat, rue de Stassart 36, B-1050 Brussels, Belgium:

i. EN 954-1**(1996)**, "Safety of Machinery—Safety-related parts of control systems—Part 1: General principles for design";

ii. EN 1050 **(1996)**, "Safety of Machinery—Principles for Risk Assessment

iii. ((No change.).)

iv EN 1993-1-9 (2001), Eurocode 3 Design of Steel Structures. Part 1.9 Fatigue Strength of Steel Structures

v EN 1993-1-9 (2001), Eurocode 3 Design of Steel Structures. Part 6.9 Crane Support Structures-Fatigue Strength

vi EN 60947-1 (1999), Low Voltage Switchgear and Controlgear

vii EN 280 (2001), Mobile Elevating Work Platforms – Design Calculations, Staility Criteria, Construction, Safety, Examination and Test

10. ((No change.).)

11**. The following standards are adopted and are [**IEC 61508, "Functional safety of electrical/electronic/programmable electronic safety-related systems," is adopted and is] available from the International Electrotechnical Commission 3, rue de Varembé, P.O. Box 131, CH - 1211 Geneva 20, Switzerland;

i. IEC-61508-1 (1999) Functional safety of electrical/electronic/programmable electronic safety-related systems

ii. IEC-60204-1 (2000) Safety of Machinery – Electrical Equipment of Machines – Part 1 General Requirements

iii. IEC-61496-1 (1998) Safety of Machinery – Electrosensitive Protective Equipment – General Requirements and Tests

iv. IEC-61511 Functional Safety: Safety Instrumented Systems for the Process Industry Sector

v. IEC-62061 Safety of Machinery – Functional Safety – Electrical, Electronic, and Programmable Electronic Systems

12. ISO 4414 **(1998)**, "Pneumatic Fluid power - General rules relating to systems," is adopted and is available from the National Fluid Power Association, 3333 North Mayfair Road, Milwaukee, Wisconsin 53222-3219;

13. ((No change.).)

14. The following standards are adopted and are available from the National Fire Protection Association, 1 Batterymarch Park, Quincy, Massachusetts 02269-9101:

i.-vi. ((No change.))

vii NFPA-101 (2000) Life Safety Code

15 .- 16. ((No change.).)

17. The following standards are adopted and are available from the SAE World Headquarters, 400 Commonwealth Drive, Warrendale, PA 15096-0001:

i. SAE J211 **(1995)**, "Instrumentation for Impact Test—Part 1—Electronic Instrumentation";

ii SAE J833 **(1989)**, "Human Physical Dimensions";[and]

iii SAE HS 4000 (1999), Fastener Standards;

18. **The following standards are adopted and are available from the [**UL 508A, "Industrial Control Panels," is adopted and is available from] Underwriters Laboratories, Inc., 333 Pfingsten Road, Northbrook, Illinois 60062-2096.

i. **UL 508 (2000) Industrial Control Equipment**

ii. UL 508A (2000), Industrial Control Panels

19. The following standards are adopted and are available from the American Society of Metals International, 9639 Kinsman Road. Materials Park, OH 44073-0002

i. ASM Atlas of Fatigue Curves (1986)

ii. ASM Handbook Volume 19: Fatigue and Fracture

20. The following standards are adopted and are available from the American Society of Mechanical Engineers, ASME International Headquarters, Three Park Avenue, NY, NY 10016-5990:

i. ASME B15.1-2000 Safety Standard for Mechanical Power Transmission Apparatus

ii. ASME A17.1-2002 Safety Code for Elevators and Escalators;

21. The following standards are adopted and are available from the British Standards Institute,389 Chiswick Road, London W4 4AL, UK

i. BS 5400-10 (1980) Steel, Concrete and Composite Bridges – Code of Practice for Fatigue

ii. BS 7608 (1993) Code for Practice for Fatigue Design and of Steel Structures;

22. "DIN 15018-1 Cranes; Steel Structures Verification and analysis Data" is adopted and is available from the Beuth Verlag GmbH (DIN – DIN Deutsches Institut für Normung e.V.), Burggrafenstraße 6, 10787 Berlin, Germany;

23. "Hollow Structural Section Connection and Trusses – A Design Guide, J.A. Parker and J. E. Henderson, is adopted and is available from Canadian Institute of Steel Construction.

24. "USDA-72 (U. S. Department of Agriculture) The Wood Handbook – Wood as an Engineering Material, Forest Service, Forest Products Laboratory," is adopted and is available from Federal Documents;

25. "NEMA 250 (1997) Enclosures for Electrical Equipment is adopted and is available from National Electrical Manufacturers Association (NEMA), 1300 N. 17th St., Suite 1847, Rosslyn,VA 22209

5:14A-2.4 Type certification

(a) A manufacturer may apply for type certification for any ride.

1. - 3. (No change.)

4. When a **major modification is performed to a** ride **[**that has**]** **having** a valid type certification **[**is modified**]**, an application for an amended type certification shall be required, **[**and shall comply with**]** **pursuant to** N.J.A.C. 5:14A-2.6.

5.- 7. (No change.)

(b) An application for a type certification for a new ride shall contain the following:

1.-6. (No change.)

[7. Certification of the fabrication of the ride;**]**

(Renumber 8.- 9. as 7.- 8.)

9. The name and the address of the New Jersey office or New Jersey residence of the ride's manufacturer or the manufacturer's representative; the manufacturer or the manufacturer's representative must reside or have an office in the State of New Jersey to accept service of process.

i. It shall be the responsibility of the manufacturer to notify the Department of any change in the identity, mailing address, office or residence address or phone number of the manufacturer or representative. Any change shall be reported to the Department in writing within 30 days of the change.

(c) – (d) (No change)

(e) Provided that the manufacturer supports the ride within the full meaning of these rules, a type certification shall be valid for a period of three years or until a new type certification or an amended type certification has been obtained.

1.- 2. (No change.)

3. The renewal of a type certification **[**where there are no modifications to the ride**]** **for a ride type that has not undergone a major modification** shall not require an engineering review.

5:14A-2.5 Individual approval

(a) An owner of a ride may apply for an individual approval for a ride.

1.- 7 (No change.)

8. If the required documentation has been submitted to the Department for a specific ride, an applicant for an individual approval may submit a certification stating that the equipment is the same equipment described in the documentation already submitted and that no [modifications have been made] **major modification has been performed.**

9. (No change.)

(b) An application for an individual approval for a new ride shall contain the following:

1.- 6. (No change.)

[7. Certification of the fabrication of the ride;**]**

(Renumber 8.- 9. as 7.- 8.)

9. The name and the address of the New Jersey office or New Jersey residence of the ride's owner or the owner's representative; the owner or the owner's representative must reside or have an office in the State of New Jersey to accept service of process.

i. It shall be the responsibility of the owner to notify the Department of any change in the identity, mailing address, office or residence address or phone number of the owner or representative. Any change shall be reported to the Department in writing within 30 days of the change.

(c) – (e) (No change.)

(f) When a **major modification is performed to a** ride **[**with**]** **having** a valid type certification **[**is modified**]** and the manufacturer does not apply for an amended type certification, the owner may apply for an individual approval.

(g) - (h) (No change.)

5:14A-2.6 Amended type certification

(a) When a **major modification is performed to a** ride **[**that has**]** **having** a valid type certification **[**is modified**]**, the type certification shall no longer **[**apply**]** **be valid**. The ride shall be taken out of service or the manufacturer shall apply for an amended type certification.

1.- 3. (No change.)

(b) The application for an amended type certification shall include the following:

1.- 2. (No change.)

3. One full set of drawings, designs, specifications, and other construction documents, signed and sealed by a licensed professional engineer, that demonstrate compliance with the design requirements of N.J.A.C. 5:14A-7, that comply with N.J.A.C. 5:14A-2.12, and are necessary for full and complete review of the **[**ride**]** **major** modification.

4 . (No change.)

5. The name and the address of the New Jersey office or New Jersey residence of the ride's manufacturer or the manufacturer's representative; the manufacturer or the manufacturer's representative must reside or have an office in the State of New Jersey to accept service of process.

i. It shall be the responsibility of the manufacturer to notify the Department of any change in the identity, mailing address, office or residence address or phone number of the manufacturer or representative. Any change shall be reported to the Department in writing within 30 days of the change.

(c) (No change.)

(d) Provided that the manufacturer supports the ride within the full meaning of these rules, an amended type certification shall be valid for a period of three years or until a new amended type certification has been obtained.

1.- 2. (No change.)

3. The renewal of an amended type certification **[**where there are no modification to the ride**]** **for a ride type that has not undergone a subsequent major modification** shall not require an engineering review.

5:14A-2.7 Supplemental modification certification

(a) When a **major modification is performed to a** ride **[**with**]** **having** a valid individual approval **[**is modified**]**, the individual approval shall no longer **[**apply**]** **be valid** and the owner of the ride shall take the ride out of service or apply for a supplemental modification certification.

1.- 2. (No change.)

(b) The application for a supplemental modification certification shall include the following:

1.- 2. (No change.)

3. One full set of drawings, designs, specifications, and other construction documents, signed and sealed by a licensed professional engineer, that demonstrate compliance with the design requirements of N.J.A.C. 5:14A-7, that comply with N.J.A.C.

5:14A-2.12, and are necessary for full and complete review of the **[**ride**]** **major** modification.

4. (No change.)

5. The name and the address of the New Jersey office or New Jersey residence of the ride's owner or the owner's representative; the owner or the owner's representative must reside or have an office in the State of New Jersey to accept service of process.

i. It shall be the responsibility of the owner to notify the Department of any change in the identity, mailing address, office or residence address or phone number of the owner or representative. Any change shall be reported to the Department in writing within 30 days of the change.

(c) - (d) (No change.)

5:14A-2.10 Annual permits and issuance of serial number plates

(a) - (b) (No change.)

(c) Each application for an annual permit shall include:

1. – 2. (No change.)

3. The name and the address of the New Jersey office or New Jersey residence of the ride's owner or the owner's representative; the owner or the owner's representative must reside or have an office in the State of New Jersey to accept service of process.

i. It shall be the responsibility of the owner to notify the Department of any change in the identity, mailing address, office or residence address or phone number of the owner or representative. Any change shall be reported to the Department in writing within 30 days of the change.

(d) For rides with a New Jersey serial number, an application for an annual permit shall contain the following information and shall be submitted on a form provided by the Department.

1. – 3. (No change.)

4. The name and the address of the New Jersey office or New Jersey residence of the ride's owner or the owner's representative; the owner or the owner's representative must reside or have an office in the State of New Jersey to accept service of process.

i. It shall be the responsibility of the owner to notify the Department of any change in the identity, mailing address, office or residence address or phone number of the owner or representative. Any change shall be reported to the Department in writing within 30 days of the change.

(e) For rides without a New Jersey serial number[, the information required in (c) and (d) above shall be submitted on a form provided by the department together with the type certification/amended type certification number or individual approval/supplemental modification certification.

1. When the Department's review determines that the ride information is complete and accepted, a New Jersey serial number shall be assigned, the annual permit shall be

printed, and the annual permit and a New Jersey serial number plate shall be sent via first class mail to the owner at the address of record.] :

1. An application for an annual permit shall include the following information and shall be submitted on a form provided by the Department:

i. Required proof of insurance and fee, as stated in (c) above;

ii. Type certification/amended type certification number or individual approval/supplemental modification certification;

iii. Certification of the fabrication of the ride;

iv. Copy of certification that the manufacture has tested the ride in accordance with ASTM F 846 and determined that the ride is satisfactory;

v. Certification of training; and

iv. For rides sited on foundation(s) or a separate structure, applicable documentation of section 5:14A-2.13 "Foundations for siting of rides".

2. There shall be no outstanding documentation required from previous years and there shall be no outstanding violations.

3. When the Department's review determines that the ride information is complete and accepted, a New Jersey serial number shall be assigned, the annual permit shall be printed, and the annual permit and a New Jersey serial number plate shall be sent via first class mail to the owner at the address of record.

(f) - (k) (No change.)

5:14A-2.11 Inspections

(a) - (d) (No change.)

(e) Acceptance inspection: An acceptance inspection shall be performed before a new ride**, or a ride having undergone a major modification,** may operate. The acceptance inspection shall verify conformance with the approved design and shall include, but not be limited to, the following:

1. (No change.)

2. A review of operator training records [and] , including [manufacturer] certification **of training in accordance with the manufacturer's procedures or manuals;**

3. (No change.)

4. A review of the certification that the manufacturer has tested the ride in accordance with ASTM F 846**[**-92**]** and determined that the ride is satisfactory. **The original of this [**This**]** certification shall remain with the ride.

5.- 9. (No change.)

10. Any ride with g's in excess of 75 percent of the limits, as set forth in N.J.A.C. 5:14A-7, shall be tested in accordance with ASTM F 2137. Any ride that has peaks greater than 75 percent of any value in the pulse width of less than 60 seconds, in figures 5 through 9 of ASTM F 2291, no matter how long its total run time, requires a Department-witnessed accelerometer test. For a portable amusement ride, this test may be performed at the factory by a third party testing agency.

5:14A-2.12 Engineering review

(a) – (d) (No change.)

(e) A special engineering review that focuses on a specific aspect of a ride may be undertaken by the Department to meet a specific need. Such a special engineering review may be undertaken in response to any of the following:

1.- 5. (No change.)

6. A **major** modification **[**from**]** **to a ride having** a type certification, amended type certification, individual approval, or supplemental modification certification.

5:14A-4.2 Ride equipment

(a) (No change.)

(b) **[**No one**]** **The owner of an amusement ride** shall **not permit a major modification of [**modify any**]** **that** ride **[**with a New Jersey permit, individual approval, or type certification**]** without **[**undergoing an engineering review for a modified ride and getting**]** **obtaining** a supplemental modification certification or an amended type certification, as [appropriate] **applicable**, **from the Department, pursuant to N.J.A.C. 5:14A-2.7 or 2.6**.

(c) (No change.)

5:14A-5.2 General requirements

(a) (No change.)

(b) The manufacturer shall affix a data plate to each ride in compliance with N.J.A.C. 5:14A-[7.19] **7.7**.

5:14A-5.4 Amended type certification

(a) The manufacturer **of an amusement ride type having a valid type certification** shall **not knowingly permit a major modification of that ride type without obtaining [**submit an application for**]** an amended type certification **from the Department**, in accordance with **[**the requirements of**]** N.J.A.C. 5:14A-2.6. **[**, for any modification to a ride that has a current type certification. The application package shall identify the differences from the information provided for the type certification.**]**

(b) – (c) (No change.)

5:14A-7.1 Title; intent; scope

(a) (No change.)

(b) **[**This subchapter establishes minimum criteria, information and procedures for the design, manufacture and modification of amusement rides and devices.**]** **The intent of this subchapter is to provide minimum criteria for the design and construction of amusement rides and devices.**

1. **[**Air-supported structures that include no other structural elements shall comply with the provisions of N.J.A.C. 5:14A-13.
2. Unmodified portions of modified rides, certified by the manufacturer or by the engineer as unaffected by the modification, shall not be required to comply with the provisions of this subchapter.**]**

(c) The scope of this subchapter shall include the design and construction of all amusement rides and devices whose design criteria are not specifically addressed in another subchapter of this chapter.

(d) The scope of this subchapter shall not include:

1. **Unmodified portions of modified rides, certified by the manufacturer or by the engineer as unaffected by the modification.**
2. **Amusement rides and devices whose design criteria are specifically addressed in another subchapter of this chapter.**
3. **Soft-play equipment, subject to these rules because of its location with other amusement rides, shall meet ASTM F 1918-98, Standard Safety Performance Specification for Soft Contained Play Equipment, and all applicable rules.**
4. **Passenger tramways shall comply with ANSI B77.1-1999, Aerial Passenger Tramways, with the following amendments:**
   - i. **Section 1.1 through 1.3 and section 8 shall be deleted.**
   - ii. **Any section or provision relating to administration or to reporting shall be deleted.**

(Redesignate (c) – (d) as (e) – (f).)

5:14A-7.2 Adoption as amended of ASTM practice F 2291-04

(a) The Standard Practice for Design of Amusement Rides and Devices, designated by the American Society for Testing Materials (ASTM) as F 2291-04, is adopted by reference, as amended, and made part of this subchapter and shall be enforced as part of this subchapter.

(b) Notwithstanding any provisions stated in the standard, where specific provisions of the standard conflict with the provisions expressly set forth in this chapter, the provisions set forth in this chapter shall govern.

(c) The following sections of the standard are modified as follows:

1. **Chapter 1, Scope, shall be amended as follows.**
   - i. **Section 1.1 shall be deleted in its entirety.**
   - ii. **Section 1.2 shall be deleted in its entirety.**
   - iii. **Section 1.5 shall be deleted in its entirety.**
2. **Chapter 2, Referenced Documents, shall be deleted in its entirety.**
3. **Chapter 3, Terminology, shall be amended as follows:**
   - i. **Section 3.1.20, the definition of "manufacturer" shall be deleted.**
   - ii. **Section 3.1.22, the words "ASTM Standard" shall be deleted and the words "provisions of N.J.A.C. 5:14A-7" shall be inserted in their place.**
4. **Chapter 4, Significance and Use, shall be deleted in its entirety.**
5. **Chapter 5, General Design Criteria, shall be amended as follows:**
   - i. **Section 5.1.1.3: In the second sentence, the word "either" shall be deleted and following the words "Fault Tree Analysis" the word "or" shall be inserted.**
   - ii. **Section 5.2.1.4: In the first sentence, the words "for passenger and vehicles" shall be inserted after the word "Calculations".**
   - iii. **Section 5.4.1, shall be deleted and replaced with, "The manufacturer shall produce and retain as-built drawings, calculations, and control software as necessary for a full and complete**

review, as required by N.J.A.C. 5:14A-2.12. These documents shall be retained in accordance with N.J.A.C. 5:14A-5.6."

iv. Add new section "5.4.1.1 If a voice communication or signal system is required under N.J.A.C. 5:14A-9.13, to the extent that the manufacturer has been involved in its development, it shall be included in the manufacturer's documentation to the Department."

v. Section 5.4.2: In the second sentence, the word "review," shall be inserted after the words "to the".

vi. Section 5.5, shall be deleted in its entirety.

6. Chapter 6, Patron Restraint, Clearance Envelope, and Containment Design Criteria, shall be amended as follows:

i. Section 6.3.1, the wording "designer/engineer. This determination shall be based on the" shall be deleted.

ii. Section 6.3.4: At the end of the section, the following sentence shall be added, "Restraints required because of ride elevation shall be the locking type, not capable of being unlocked by patrons."

iii. Section 6.3.6: In the first sentence, the word "manufacturer" shall be deleted and the word "design" shall be inserted in its place. Also, at the end of the section, the following sentence shall be added, "The design for emergency evacuation shall be such that riders shall be kept safely on the ride or shall be safely evacuated."

iv. Section 6.3.7: In the first sentence, the word "manufacturer" shall be deleted and the word "design" shall be inserted in its place.

v. Section 6.3.10: In the first sentence, the word "manufacturer" shall be deleted and the word "design" shall be inserted in its place.

vi. Section 6.3, Patron Restraints, add new subsection: "6.3.12 Any ride where it is possible for a rider to slide laterally shall be designed to adequately and safely contain the rider in the ride. When designing ride pieces which riders will slide into, the design shall account for the rider and any fellow riders who will be sliding into those pieces while being contained by the ride."

vii. Section 6.3, Patron Restraints, add new subsection: "6.3.13 Restraints shall not be required for water slides, wave pools, water play areas, lazy rivers or other, similar rides."

viii. Section 6.3, Patron Restraints, add new subsection: "6.3.14 If Gx exceeds +0.2 g for more than 0.2 seconds, a backrest shall be required. If Gx exceeds +0.5 g for more than 0.2 seconds, a full backrest shall be required. If Gx exceeds 1.5 g for more than 0.2 seconds, see Note 1 on Figure 5. If +Gx exceeds +2.5 g for more than 0.2 seconds, a headrest, which discourages both lateral movement and movement away from the headrest, shall be required. As used in this subsection, a backrest does not allow a person to slide off the seat backwards. A full backrest supports the torso up to the shoulders. A headrest supports the back of the head."

ix. Section 6.3, Patron Restraints, add new subsection: "6.3.15 Unless the ride analysis indicates otherwise, if there are accelerations

in the X or Z direction that exceed 1 g or Gy exceeds 0.5 g in either direction, there shall be hand holds (including, for example, the lap bar) with a 1 ½ inch maximum diameter for the riders to grasp to help support themselves."

x. Section 6.3, Patron Restraints, add new subsection: "6.3.16 For any ride in which accelerations exceed 2 g or are less than-2 g in any direction, the rider shall be well and closely restrained in the direction to resist the acceleration.

6.3.16.1 One of the following may be used as an alternative method of rider protection:

6.3.16.1.1 The ride dynamics shall be designed such that no impact or only light impact with the restraint takes place while still keeping the rider well restrained;

6.3.16.1.2 Ride padding shall be designed to absorb impact load; or

6.3.16.1.3 Another means acceptable to the Department shall be used."

xi. Section 6.4.1: In the first sentence, following the word "part" the word "of" shall be inserted.

xii. Section 6.4.2: The first sentence shall be deleted in its entirety. In the second sentence, the words "another class of restraint" shall be deleted and replaced with the words "a class of restraint other than that indicated by Fig. 2".

xiii. Section 6.6.2: In the first sentence, the words "The designer/engineer shall determine" shall be deleted and the words "shall be" shall be inserted after the word "envelope".

xiv. Section 6.6.3.3: In the first sentence, following the word "ride" the word "and" shall be deleted and the word "or" inserted in its place. Also, the words "(for example, while seated in separate vehicles), the Designer/Engineer shall take reasonably" shall be deleted and the words "shall be taken" shall be inserted after the word "steps". Also, add the following sentence to the end of this section, "Patron safety shall be addressed as dictated by the Ride Analysis."

xv. Section 6.6.4: In the first sentence, the words "The designer/engineer or manufacturer shall determine" shall be deleted and the words "The design shall specify" shall be inserted in its place.

xvi. Section 6.6.4.1: In the first sentence, the word "determined" shall be deleted and the word "specified" shall be inserted in its place. Also, in the first sentence, the word "may" shall be deleted and the word "shall" shall be inserted in its place

xvii. Section 6.7: In the first sentence, the words "manufacturer shall determine and may make" shall be deleted and the words "design shall include" shall be inserted in its place. In the second sentence, the word "should" shall be deleted and replaced with the word "shall".

xviii. Add new section: "6.8 Secondary safety devices such as latching belts, straps or other devices that limit the travel of a primary restraint device are acceptable."

7. Chapter 7, Acceleration Limits, shall be amended as follows:

i. Section 7.1.1 shall be deleted and replace it with the following: "7.1.1 Amusement rides and devices shall be designed such that the accelerations are within the limits specified in this practice. Any ride submitted for type certification/amended type certification or individual approval/supplemental modification certification with g's in excess of 75 percent of the limits of this subchapter shall be tested in accordance with ASTM F 2137. Any ride that has peaks greater than 75 percent of any value in the pulse width of less than 60 seconds in Figures 5 through 9, no matter how long its total run time, requires a Department-witnessed accelerometer test at the time of the acceptance inspection. For a portable amusement ride, this test may be performed at the factory by a third party testing agency. Test data intended for evaluation against the limits specified in this subchapter shall be acquired and prepared as follows:"

ii. Section 7.1.3: In the fourth sentence, the words "Designer/Engineer" shall be deleted and the words "Ride Analysis" shall be inserted in its place. Also, add the following sentences to the end of this section, "For roller coasters, the maximum pitch, roll, and yaw design acceleration rates on the ride are (1rev/sec^2) or (2? /sec^2). Higher values may be used if demonstrated to be safe in the Ride Analysis. These are not to be used to exceed maximum acceleration rate from Figures 5 through 9."

iii. Section 7.1.4.3: In the second sentence, the words "designer/engine er" shall be deleted and the words "Ride Analysis" shall be inserted in their place.

iv. Section 7.1.4.4 shall be deleted in its entirety.

v. Section 7.1.4.6: The second sentence shall be deleted and the sentence "Sustained exposure shall not exceed 90 seconds in a single event." shall be inserted in its place.

vi. Section 7.1.8: The sentence "Sustained exposure in +Gz shall not exceed 40 seconds in a single event." shall be added.

8. Chapter 8, Loads and Strengths, shall be amended as follows:

i. Section 8.3.1: In the second sentence, the words "designer/engineer shall verify" shall be deleted and the words "design shall demonstrate" shall be inserted in its place.

ii. Section 8.3.2.1: In the second sentence, the words "designer/engineer-defined" shall be deleted and the word "design" shall be inserted in its place. Also, in the third sentence, "50%" shall be deleted and "30%" shall be inserted in its place.

iii. Section 8.3.3: In the first sentence, the words "designer/engineer shall determine" shall be deleted and the words "design shall specify" shall be inserted in its place.

iv. **Section 8.4.1: In the first sentence, the words "per the designer/engineer's" shall be deleted and the words "as specified in the ride inspection and maintenance" shall be inserted in its place.**

v. **Section 8.4.2: In the first sentence, the words "designer/engineer" shall be deleted and the words "design" shall be inserted in its place.**

vi. **Section 8.5 shall be deleted and replace it with the following: "8.5 Operation beyond the 35,000 operational hour criteria:**

8.5.1. No ride may operate beyond the life span of a ride, as provided in this practice and as calculated by the manufacturer, unless the ride has been reviewed by the design engineer or another licensed professional engineer and the ride has been determined to have remaining life. (In cases where such a review is undertaken by a licensed professional engineer who is not the design engineer, the design engineer shall be notified, where possible.)

8.5.1.1 To extend operation, the reviewing engineer shall perform an evaluation and inspection of the amusement ride and either prescribe appropriate inspection and testing at specified intervals, including a date when the ride is to be reevaluated for continued operation, or calculate a new, extended fatigue life or both.

8.5.1.1.1 The engineer's review shall include a review of the operating or maintenance instructions and a list of any new or modified operating or maintenance procedures, in addition to inspection and testing, to be followed.

8.5.1.2 Any new or modified operating or maintenance procedures, including any inspection and testing prescribed, shall be incorporated in the ride operating or maintenance instructions, or both, as may be appropriate. An amended type certification or an individual approval for the ride shall be required and the ride shall not be used or operated beyond the lifespan unless and until such amendment is approved by the Department."

vii. **Section 8.6.4: The words "designer/engineer" shall be deleted and the words "ride analysis or other design documentation" shall be inserted.**

viii. **Section 8.6.6: The words "as specified by the designer/engineer" shall be deleted.**

ix. **Section 8.6.7: In the first sentence, the words "the designer/engineer in" shall be deleted.**

x. **Section 8.6.8: Add the following sentence to the end of this section, "For kiddie rides, this analysis shall be performed using 160 pounds per seat."**

xi. **Section 8.7.1: In the first sentence, the words "designer/engineer-defined" shall be deleted.**

xii. **In Section 8.7, Loads, add new subsection: " 8.7.4 For portable rides, an evaluation shall be done in the trailering position. Steps shall be taken to provide any bracing that may be needed to support the**

ride structure, in order to protect it from fatigue and overload conditions."

xiii. **In Section 8.10, Operational (Dynamic) Loads, add new subsection: "8.10.3 Elevated walking surfaces, including, but not limited to, waiting areas, loading and unloading areas, platforms, landings, stairs, and ramps, shall be designed to accommodate a live load of at least 100 pounds per square foot."**

xiv. **Section 8.11.1: The word "design" shall be added after the word "the".**

xv. **Section 8.12.1: The words "designer/engineer defined" shall be deleted. Also, add the words "that can be reasonably anticipated." following the word "loads".**

xvi. **In Section 8.12, Environmental Loads, add new subsection: "8.12.2.1 Each type certified ride shall comply with 8.12.2 above or shall be designed for the worst case environmental conditions in New Jersey.**

xvii. **Section 8.12.3: The first sentence shall be deleted and replaced with, "The operating and maintenance instructions shall clearly indicate the environmental loads for which the amusement ride or device was designed."**

xviii. **In 8.13.1 add new section: "8.13.1.1 The Department may permit an exception to 8.13.1 when it is impractical and unnecessary to operate in wind speeds of 34 mph or greater. Rides designed to operate in winds of less than 34 miles per hour shall have operating limitations clearly stated in operating and maintenance manuals. This shall include, but not be limited to, clear instructions on wind speeds at which to cease operation.**

xix. **Section 8.13.2: In the first sentence, the words "designer/engineer or manufacturer" shall be deleted and replaced with the words "operating and maintenance instructions". Also, the words "in the operating and maintenance instructions" shall be deleted.**

xx. **Add new section: "8.13.3 Overturning calculations and load and strength calculations, as necessary, shall be required for operational wind loads."**

xxi. **Section 8.14.1: In the first sentence, the words "designer/engineer or manufacturer" shall be deleted and replaced with the words "operating and maintenance instructions". Also, the words "in the operating and maintenance instructions" shall be deleted.**

xxii. **Add new section: "8.14.2 Overturning calculations and load and strength calculations, as necessary, shall be required for non-operational wind loads."**

xxiii. **Add new section: "8.14.3 The maintenance manual shall clearly indicate wind speeds at which partial disassembly and removal shall take place if necessary.**

xxiv. **Section 8.15.1: Add a second sentence, "Test and measurement data may be substituted for numerical analysis."**

xxv. Section 8.15.3: The first sentence shall be deleted and replace it with the following, "The structural analyses shall consider and incorporate all significant loads and shall evaluate all significant stresses, strains and deflections that may be experienced by the amusement ride or device."

xxvi. Section 8.15.4: In the first sentence, the words "designer/engineer defined" shall be deleted.

xxvii. Section 8.15.7: At the beginning of the first sentence, add the words "An analysis of". Also, in the first sentence, the word "evaluated" shall be deleted and the word "required" shall be inserted in its place. In the third sentence, the words "engineer/designer" shall be deleted and the word "design" inserted in its place.

xxviii. Section 8.16.1: Add the following sentence to the end of this section, "Amusement rides or devices that exceed 60 miles per hour shall use an impact factor of not less than 1.5 in the calculations unless empirically measured values show that a value less than 1.5 is appropriate."

xxix. Section 8.16.5: In the first sentence, the words "design shall account for" shall be added after the first "The". Also, in the first sentence, the words "(as defined by the Designer/Engineer) shall be considered" shall be deleted.

xxx. Section 8.18.1: In the third sentence, the words "in addition" shall be deleted and the words "a multiplier" shall be inserted in their place.

xxxi. Section 8.20.1: In the second sentence, "M105" shall be deleted and the words "Manual of Steel Construction ASD, 9th edition" shall be inserted in its place.

xxxii. In Section 8.21, Design for Strength, add new subsection: "8.21.3 The manufacturer shall perform a load combination analysis according to the equations in section 2.3.2 or section 2.4.1 of ASCE 7 or an equivalent standard for local combinations.

8.21.3.1 Live loads shall include dynamic loads.

8.21.3.2 Thermal loads affecting components of the ride or foundation shall be included in load combinations.

8.21.3.2.1 If it can be shown that footings may be allowed to move to accommodate thermal expansion and contraction without degrading the footings' ability to resist other loadings, then thermal loads may be treated separately and taken out of the combined loading equation.

8.21.3.3 The multiplier for the live load equations 2 and 3 in section 2.3.2 of ASCE 7 may be 1.33 instead of 1.6 as long as the live load is already being multiplied by an impact factor of 1.2, or greater."

xxxiii. Section 8.22 shall be deleted in its entirety.

xxxiv. Section 8.23 shall be deleted in its entirety.

xxxv. Section 8.24 shall be deleted in its entirety.

xxxvi. Section 8.25 shall be deleted in its entirety.

xxxvii. Section 8.26 shall be deleted in its entirety.

xxxviii. Section 8.27.3: In the first sentence, the words "Designer/Engineer either know (through empirical measurement) or estimate" shall be deleted and the words "design account for" shall be inserted in its place. Also, the following sentence shall be inserted after the first sentence, "This can be shown either through empirical measurement or by estimating."

xxxix. Section 8.27.4: In the first sentence, the words "and allowable utilized to evaluate the same structure" shall be deleted and the word "used" shall be inserted in its place.

xl. Section 8.27.5: In the first sentence, the words "by a" shall be deleted and the words "that in the AISC Manual of Steel Construction, 9th edition, Chapter K or another" shall be inserted in their place.

xli. In Section 8.27, Design for Fatigue, add new subsection: "8.27.7 For portable rides, an evaluation shall be done in the trailering position. Steps shall be taken to provide any bracing that may be needed to support the ride structure, in order to protect it from fatigue and overload conditions."

xlii. Section 8.30.1: In the first sentence, the words "designer/engineer" shall be deleted and the word "design" shall be inserted in its place.

xliii. Section 8.30.2 shall be deleted and replace it with the following: "8.30.2 In the case where the raw fatigue property data is available, the "Mean-2s" value can be calculated by standard statistical techniques illustrated in Figure A1.1. In the absence of such data, a reduction of 18 percent for welded joint details shall be used and a reduction of 12 percent for parent materials shall be used."

xliv. In Section 8.30, Fatigue Material Allowable Properties, add new subsection: "8.30.3 Performing cumulative damage analysis: If the Ride Analysis defines primary structure that should be designed or a finite fatigue life, the steps listed in the following subparagraphs should be followed.

8.30.3.1 Identification of loads and determination of the proper stress allowables are two key elements required to ensure amusement rides and devices possess adequate structural capability.

8.30.3.2 The procedure to be used to verify that structures possess adequate structural capability consists of the following basic steps:

8.30.3.2.1 Identifying all expected external and internal loading including where these loads will be applied.

8.30.3.2.2 Calculating, or empirically measuring, stresses and strains.

8.30.3.2.3 Determining the appropriate stress allowables (that is, strengths of materials).

8.30.3.2.4 Comparing the computed or measured values for stresses or strains, based upon expected loading conditions, to the values for the respective design stress allowables.

8.30.3.2.5 If the calculated stresses are determined to be greater than the material allowables, redesigning and validation of analytical predictions with empirical testing shall be done.

xlv. Section 8.31.1: In the first sentence, the words "designer/engineer provided" shall be deleted. In the second sentence, the words "designer/engineer" shall be deleted and the word "design" shall be inserted in its place.

xlvi. Section 8.31.2: In the first sentence, the words "Within the Manufacturer-provided written" and "the manufacturer" shall be deleted. In the second sentence, the words "specific" and "instruction" shall be deleted. In the third sentence, the word "written" shall be deleted.

xlvii. In section 8.32, Metal Structures, add new subsection: "8.32.2 For steel structures, the AISC Manual of Steel Construction shall be used for design and acceptance criteria. Another standard may be used if it can be shown to be equivalent."

xlviii. In section 8.32, Metal Structures, add new subsection: "8.32.3 Materials shall be resistant to corrosion from salt air or shall be protected from such corrosion."

xlix. Section 8.33.2: In the first sentence, the words "shall be reduced as deemed adequate by the designer/engineer as required" shall be deleted and the words "may be reduced" inserted in their place.

l. In Section 8.33.3: In the first sentence, the words "As a general rule" shall be deleted.

li. In Section 8.33.3 add a new section "8.33.3.1 To prevent compression damage to timber members around fasteners, appropriate methods, such as steel plates or large outside diameter washers, shall be provided. Star washers or other such devices shall not be used in disconnectable timber joints.

lii. In Section 8.33.3 add a new section "8.33.3.2 Where tensile forces associated with holes in timber members act at right angles or obliquely to the direction of the grain, where splitting or tearing of the wood might result, wraparound plates or other suitable means shall be used on either side of fastener holes to absorb these forces."

liii. Section 8.33.4: In first sentence, the words "designer/engineer shall design the" shall be deleted and the words "design shall include" shall be inserted in its place. In the second sentence, the words "designer/engineer" shall be deleted and the word "design" shall be inserted in its place.

liv. Section 8.35.2: In the first sentence, the words "designer/engineer shall properly select and design" shall be deleted and the words "design shall include" shall be inserted in its place.

9. Chapter 9, Hydraulic Systems and Components, shall be amended as follows:

i. Add section "9.6 The design of hydraulic systems shall include means for isolating and locking-out stored hydraulic energy from ride components subject to maintenance and inspection.

ii. Add section "9.7 Pressure vessels shall conform to requirements of N.J.A.C. 12:90."

10. Chapter 10, Pneumatic Systems and Components, shall be amended as follows:

i. Section 10.2: In the second sentence, the words "or designer/engineer" shall be deleted.

ii. Section 10.3.2, the word "should" shall be deleted and the word "shall" shall be inserted in its place.

iii. Section 10.3.5, the words "not create additional hazard (for example, by releasing any locating pin, index drive engagement, latch, clamping or similar device)" shall be deleted and the words "be deleted" shall be inserted in their place.

iv. Add section "10.4 The design of pneumatic systems shall include means for isolating and locking-out stored pneumatic energy from ride components subject to maintenance and inspection.

v. Add section "10.5 Pressure vessels shall conform to requirements of N.J.A.C. 12:90."

11. Chapter 11, Safety Related Electrical/Electronic/Programmable Electronic Control Systems, shall be amended as follows:

i. Section 11.2.1: Following "IEC 61508-1," and preceding the word "and" the words "EN 61496, UL 508A," shall be inserted.

ii. Section 11.3.1 shall be deleted and replaced with the following:

"11.3.1 General requirements:

11.3.1.1 The safety-related control system shall be capable of maintaining the designed safety integrity level under operating conditions.

11.3.1.2 Safety-related control systems and functions shall have priority over all other control systems and functions.

11.3.1.3 Non-safety-related functions within or outside of the safety-related control system shall be designed so that non-safety related functions cannot compromise the integrity of the safety-related control system.

11.3.1.3.1 This requirement shall not apply to necessary manual procedures (for example, reset, maintenance, evacuation) undertaken with adequate safeguards.

11.3.1.4 The safety-related control system shall be designed and constructed so that the principles of IEC 61508, Functional Safety of Electrical/ Electronic/Programmable Electronic Safety-related systems, and UL 508A, UL Standard for Safety for Industrial Control

Panels, are fully taken into account; and
11.3.1.5 The safety-related control system shall be maintained when faults occur.

iii. **Section 11.4.1.1, delete the word "control" where preceding the word "power" in two locations.**

iv. **Section 11.4.1.2, the word "control", where preceding the word "power", shall be deleted in two locations.**

v. **Section 11.5: In the first sentence, the word "manufacturer" shall be deleted and the word "design" shall be inserted in its place. Also, in the first sentence, the word "manufacturer's" shall be deleted.**

vi. **Section 11.6, the words "that are" shall be deleted and the words "which shall be" inserted in their place.**

12. **Chapter 12, Electrical Requirements, shall be amended as follows:**

i. **Section 12.1.1: In the third sentence, the words "this guideline for North America" shall be deleted and the words "these requirements, except as modified by these rules." In the forth sentence, following the word "code", insert the words "and standards." In the fifth sentence, the words "authority having jurisdiction" shall be deleted and the word "Department" shall be inserted.**

ii. **Add new section "12.1.1.1 In subsection 525.21(A) of NFPA 70, National Electric Code, 'Rides, Tents and Concessions', 'Disconnecting Means', the phrase "Where accessible to unqualified persons" shall be deleted.**

iii. **Section 12.1.2.2, the word "Other" shall be deleted and the word "A" inserted in its place.**

iv. **Section 12.1.3, Table 1: In the subtitle line, the words "ASTM F 1159" shall be deleted and the words "ASTM F 2291" inserted in its place, in two locations. Also, in the subtitle line, the words "NFPA 70-2000" shall be deleted and the words "NFPA 70-2002" shall be inserted in its place. In the line starting with 12.6 (ASTM F 1159 Section Number), the corresponding NFPA 70 Chapter 7 shall be deleted and Chapters "6 and 8" shall be inserted in its place. In the line starting with 12.7 (ASTM F 1159 Section Number), the corresponding NFPA 70 Chapter 8 shall be deleted and Chapter "5" shall be inserted in its place.**

v. **Section 12.1.4.1: In the first sentence, the words ", other than for routine maintenance/repair," shall be deleted. In the second sentence, the words "that changes the operation/function of the equipment" shall be deleted.**

vi. **Section 12.1.4.2, shall be deleted in its entirety.**

vii. **Section 12.1.4.3, shall be deleted in its entirety.**

viii. **Section 12.1.5.1: Add "F" after ASTM in line 10 and add "or ASTM F 2291" after 1159 in the same line.**

ix. **In section 12.1.5, Signage Requirements, add new subsection: "12.1.5.3 All electrical outlets operating at more than 120 volts to the ground shall be clearly marked to indicate their voltage.**

x. **Section 12.2.1.1, the words "20-ampere line-neutral branch circuit" shall be deleted and the words "125 volt, 20 ampere, branch circuit with GFCI protected receptacle outlet" shall be inserted in their place.**

xi. **Section 12.2.2.1, following the word "be" the words "grouped and shall be" shall be inserted.**

xii. **Section 12.2.3.1, the words "Refer to" shall be deleted and the words "shall be used, except when overridden by this subchapter or chapter." shall be added at the end of the sentence.**

xiii. **In section 12.2.3, add a new section "12.2.3.3 No overcurrent protection device shall be installed in neutral or grounding conductors."**

xiv. **In section 12.2.3, add a new section "12.2.3.4 All stepping and control transformers shall be grounded."**

xv. **Section 12.3.2, the words "have a rating for the appropriate environment." shall be deleted and the words "be rated minimum 'NEMA 3R,' equivalent or better as necessary to address environmental conditions." shall be inserted in its place.**

xvi. **Section 12.4.1.4: Add the following words to the end of the first sentence, "except where riders and by-standers may have access to it."**

xvii. **Section 12.5.1 shall be deleted in its entirety.**

xviii. **Section 12.5.3.1, the words "NEC 2000" shall be deleted and "NEC/2002" shall be inserted in its place.**

xix. **Section 12.5.3.2, the words "NEC 2000" shall be deleted and "NEC/2002" shall be inserted in its place.**

xx. **Section 12.5.4.1: In the first sentence, the word "located" shall be deleted and the words "shall be" shall be inserted in its place. Also, in the second sentence, the words "shall be" shall be inserted between the words "or" and "near".**

13. **Chapter 13, Mechanical Systems and Components, shall be amended as follows:**

i. **Section 13.2.2, the words "design/engineer specified" shall be deleted and the words "specified design" shall be inserted in their place.**

ii. **In section 13.2, Chain, add new section: "13.2.12 Chains on lift hills shall be retained in the trough."**

iii. **Section 13.3.4, the words "design/engineer" shall be deleted and the word "the" shall be inserted in their place.**

iv. **Section 13.3.5, the word "patch" shall be deleted and the word "path" shall be inserted in its place.**

v. **Section 13.3.9, the word "should" shall be deleted and the word "shall" shall be inserted in its place.**

vi. **Section 13.3.10, the word "should" shall be deleted and the word "shall" shall be inserted in its place.**

vii. **Section 13.3.13, the words "should be considered" shall be deleted and the words "shall be in place," shall be inserted in its place.**

viii. **Section 13.4.5: Delete the third sentence and replace it with the following sentence, "When a rollback has occurred, at least one anti-rollback device shall be engaged until the rollback has been corrected."**

ix. **Section 13.6.3.3: In the first sentence, the word "should" shall be deleted and the word "shall" shall be inserted in its place.**

x. **Section 13.7.2.1, the words "designer/engineer specified" shall be deleted and the word "design" inserted in their place.**

xi. **Add new section "13.7.2.1.1 If vehicles, or other components, of an amusement ride may collide upon failure of normal controls, a safety brake shall be provided to prevent such collision."**

xii. **Add new section "13.7.2.2 Safety brakes shall be designed such that no single component failure can diminish the effectiveness of the brake(s) such that the intended safety brake function is compromised.**

xiii. **Add new section "13.7.2.3 Safety brakes shall be equipped with an automatic system that causes correct positioning (closed or open) of the brakes, preventing a vehicle from entering a zone of block ahead of it that is occupied."**

xiv. **Add new section "13.7.2.3.1 Safety brakes pursuant to 13.7.2.1.1 shall have a redundant safety system that, in the event of a single component failure, prevents two vehicles or two trains from occupying the same block at the same time."**

xv. **Add new section "13.7.2.3.2 Alternative systems that achieve the same result may be used."**

xvi. **Add new section "13.7.2.4 Amusement rides and devices that make use of multiple vehicles of trains shall be equipped with a "fail-safe" braking system that, in the event of a complete power failure, is designed to stop all vehicles or trains at the next stopping location. If a stoppage occurs, some vehicles may be on elevated parts of the ride. A written procedure for evacuation shall be in place to address such situations."**

xvii. **Add new section "13.7.2.5 All remote operator stations shall be equipped with an emergency stop button, or stop button, for the purpose of correctly positioning the safety brakes to stop the vehicle without allowing it to pass to another block."**

xviii. **Add new section "13.7.2.6 Safety braking systems utilizing air to activate brakes shall have a pressure sensing device installed after the main air source, which causes an emergency stop condition in the event of loss of air pressure."**

xix. **Add new section "13.7.2.7 Safety braking systems utilizing air to activate brakes shall have an individual holding tank at each set of**

brakes with a "check valve" or "one-way valve" to prevent complete loss of air pressure, in the event of a line break or compressor fault."

xx. **Section 13.7.3.1, the words "designer/engineer specified" shall be deleted and the word "design" inserted in their place.**

xxi. **Add new section: "13.8 Internal combustion engines"**

xxii. **Add new section: "13.8.1 Internal combustion engines for amusement rides shall be of adequate type, design, and capacity to handle the design load."**

14. **Chapter 14, Fencing, Guardrails, and Handrails for Amusement Rides and Devices, shall be amended as follows: The words "Manufactured After January1, 2003" shall be deleted from title.**

i. **Section 14.1, the word "patron" shall be deleted in two locations.**

ii. **Section 14.2.1, the word "patron" shall be deleted in two locations.**

iii. **Section 14.2.1.1, the word "patron" shall be deleted in four locations.**

iv. **Section 14.2.1.2: Add the following words to the end of the first sentence, "and shall be designed to resist a load of 50 pounds per linear foot applied in any direction and to transfer the loads through the supports to the structure."**

v. **Section 14.3.1.1, the word "patron" shall be deleted in two locations.**

vi. **Section 14.5.2, the word "patron" shall be deleted.**

vii. **Add new section "14.5.3 Gates shall be self-closing and self-latching or have an operator at gate when ride is operating."**

viii. **Add new section "14.6 For lift hills, guardrails shall have a top rail, an intermediate rail, and a toe board."**

15. **Chapter 15, Welding, shall be amended as follows:**

i. **Section 15.1: Add the following sentence to the end of the section, "All welding used as a method of fabrication or assembly shall conform to AWS D1.1-2000, Structural Welding Code or equivalent."**

ii. **Section 15.4, the words "manufacturer's retention policy" shall be deleted and the words "record retention requirements of N.J.A.C. 5:14A" shall be inserted in their place.**

16. **Chapter 16, Fasteners, shall be amended as follows:**

i. **Section 16.1.4, the words "designer/engineer" shall be deleted and the word "design" shall be inserted in their place.**

ii. **Section 16.1.5: In the first sentence, the words "is the preferred" shall be deleted and the words "shall be the" shall be inserted in its place. Also, the second sentence shall be deleted in its entirety.**

iii. **Add new section "16.1.5.1 An exception may be made by the Department for items which cannot be through bolted or are not intended to be removed for service or maintenance. In these cases,**

other fastening methods may be used, if demonstrated by the design to be appropriate.

iv. **Section 16.1.6, the word "should" shall be deleted and the word "shall" shall be inserted in its place.**

v. **Section 16.1.9. the word "should" shall be deleted and the word "shall" shall be inserted in its place.**

vi. **In Section 16.1, General, add new subsection: "16.1.10 All bolts, cap screws, and studs shall be SAE Grade 5, ASTM A325, equivalent or better."**

vii. **Add new section, "16.1.10.1 An exception shall be permitted where the design demonstrates graded fasteners are not required."**

viii. **Add new section, "16.1.10.2 In safety-related structures, fasteners shall be proof tested by lot."**

ix. **Section 16.2.2, the words "where specified torque values" shall be deleted.**

x. **Add new section "16.2.2.1 An exception shall be permitted where the design demonstrates hardened washers are not required.**

17. **Annex A1, Loads and Strengths, shall be amended as follows:**

i. **Section A1.1.1: In the first sentence, the words "(that is, minimum design requirements and considerations) to be applied by the designer/engineer" shall be deleted and the words "for minimum design requirements that shall be used" inserted in their place.**

ii. **Section A1.1.2: In the second sentence, the words "by allowing the designer/engineer to determine" shall be deleted and the words "in defining" shall be inserted in their place. Also, in the third sentence, the words "determined and treated by the designer/engineer" shall be deleted and the words "used in the design" shall be inserted in their place.**

iii. **Section A1.2.1, the words "the designer/engineer can design" shall be deleted. Also, following the word "device", the words "may be designed" shall be inserted.**

iv. **Section A1.2.2.1: In the first sentence, "50%" and "43%" shall be deleted and "30%" shall be inserted in both places. Also, in the calculation, "0.43" shall be deleted and "0.30" shall be inserted in it's place and "19,500 Operational hours" shall be deleted and "24,500 Operational hours" shall be inserted in its place.**

v. **Section A1.2.3: In the last sentence, the word "could" shall be deleted and the word "may" shall be inserted in its place.**

vi. **Section A1.2.4.1: In the first sentence, "19,500" shall be deleted and "24,500" inserted in its place. In the second sentence, the word "or" shall be deleted and the word "of" shall be inserted in its place. In the calculation, "19,500 Operational hours" shall be deleted and "24,500 Operational hours" shall be inserted in its place. Also, in the calculation, "2,394,000 load cycles" shall be deleted and "2,940,000 load cycles" shall be inserted in its place. In the last sentence, "2.39 x**

10^6" shall be deleted and "2.94 x 10^6" shall be inserted in its place. Also in the last sentence, "19,950" shall be deleted and "24,500" shall be inserted in its place.

vii. **Section A1.3.1, the words "the designer/engineer to exempt" and the word "that" shall be deleted. Also, following the words ""covered by 8.3.1,", the words "to be exempt" shall be inserted.**

viii. **Section A1.4.1: In the second sentence, the words "Designers/engineers and manufacturers that design" shall be deleted and the words "Design of" shall be inserted in their place.**

ix. **Section A1.5.1.2: In the second sentence, the words "designer/engineer is required to" shall be deleted and the words "design shall" shall be inserted in their place.**

x. **Section A1.5.1.5, the word "should" shall be deleted and the word "shall" shall be inserted in its place.**

xi. **Section A1.5.1.6 shall be deleted in its entirety.**

xii. **Section A1.6.2 shall be deleted in its entirety.**

xiii. **Section A1.7.1: In the second sentence, the words "needs to" shall be deleted and the word "shall" shall be inserted in its place.**

xiv. **Section A1.8: In the last sentence, the words "as determined by the designer/engineer" shall be deleted.**

xv. **Section A1.9.1.3: the words "Wind (operational)" shall be added.**

xvi. **Section A1.9.2.6 (5) shall be deleted in its entirety and the sentence "Validate analytical predictions with empirical testing as necessary." shall be inserted in its place.**

xvii. **Section A1.9.2.7: Delete the first sentence and replace it with the following sentence, "The design shall account for the following loads:"**

xviii. **Section A1.10.4.4: In the fifth sentence, the word "must" shall be deleted and the word "shall" shall be inserted in its place.**

xix. **Section A1.10.5, the words "designer/engineer" shall be deleted and the word "design" inserted in its place.**

xx. **Section A1.11.1: In the second sentence, the words "that would concern patrons and operators" shall be deleted.**

xxi. **Section A1.12.3: The third, fourth and fifth sentences shall be deleted in their entirety.**

xxii. **Section A1.14 shall be deleted in its entirety.**

xxiii. **Section A1.15.3: In the first sentence, "ASCE 16" shall be deleted and "AF&PA/ASCE 16" shall be inserted in its place.**

xxiv. **Section A1.16 shall be deleted in its entirety.**

xxv. **Section A1.17.2: In the first sentence, the words "Note also that" shall be deleted.**

xxvi. **Section A1.18.1.1: In the second sentence, the word "resent" shall be deleted and the word "present" shall be inserted in its place.**

xxvii. **Section A1.18.1.2, the third, and fourth sentences shall be deleted in their entirety and the sentence "A ratio of standard deviation to mean value of fatigue strength shall be taken as 18% for welded joints and 12% for parent materials." shall be inserted in their place.**

xxviii. Section A1.18.1.5 shall be deleted in its entirety and the following inserted in its place: "Stresses within a structure shall be less than the endurance limit for the material being used. This infers that the structure will last indefinitely without cracking for the given loading duty cycle. Where it is not feasible to keep the stresses within a structure less than the endurance limit for the material being used, where the presence of an endurance limit cannot be justified on the basis of available material data, or in the case of welded components, where the effect of corrosive agents on some metals, especially when in a welded configuration, leads to an S-N curve that does not exhibit a distinct flattened region at a high cycle count, a finite life calculation shall be required. See Fig. A1.1."

xxix. Section A1.18.2.1: In the first sentence, the words "considered by the designer/engineer" shall be deleted and the word "followed" shall be inserted in their place.

(d) The ASTM standard F 2291-04 may be obtained from:

American Society for Testing Materials
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959.

5:14A-7.7 Identification, data plates and manufacturer's information

(a) Amusement rides and devices shall be identified and have an Information Plate as required by ASTM F 698.

(b) The information plate shall be of metal, or equivalent, with information legibly impressed.

5:14A-9.4 Identification, data plates and manufacturer's information

(a) A data plate that conforms to the requirements of N.J.A.C. 5:14A-**[**7.19**]** **7.7** shall be affixed to each ride.

1. (No change.)

5:14A-9.15 Ride loading and unloading

(a) The means of loading and unloading from each ride shall be maintained in compliance with the specifications and N.J.A.C. 5:14A-**[**7.16**]** **7.6**.

1. Controls and dimensions in place as of the effective date of these regulations shall be permitted to remain. All replacement components shall comply with the requirements of N.J.A.C. 5:14A-**[**7.16**]** **7.6** to the greatest extent possible.

5:14A-9.17 [Emergency] Safety brakes

[Emergency] Safety brakes and anti-rollback devices shall be provided and maintained in compliance with [N.J.A.C. 5:14A-7.25, 7.30 and 9.3] **sections 13.4 and 13.7 of ASTM F 2291, as amended in N.J.A.C. 5:14A-7.2, and N.J.A.C. 5:14A-9.3.**

5:14A-9.19 Rider restraint, restrictions, containment

(a) Restraining, containing, or cushioning devices shall be maintained in compliance with the manufacturer's specifications and [N.J.A.C. 5:14A-7.3] **Chapter 6 of ASTM F 2291, as amended in N.J.A.C. 5:14A-7.2**

1. The design requirements of **[**N.J.A.C. 5:14A-7.3**]** **Chapter 6 of ASTM F 2291, as amended in N.J.A.C. 5:14A-7.2** shall not apply to devices in place as of December 16, 2002. Replacement devices shall comply with **[**N.J.A.C. 5:14A-7.3**]** **Chapter 6 of ASTM F 2291, as amended in N.J.A.C. 5:14A-7.2** to the greatest extent possible.

5:14A-9.21 Electrical equipment and wiring

(a) All electrical equipment and wiring shall be installed and maintained in compliance with **[**N.J.A.C. 5:14A-7.21**]** **Chapter 12 of ASTM F 2291, as amended in N.J.A.C. 5:14A-7.2.**

1. Equipment and wiring in place as of December 16, 2002 shall be permitted to remain provided that it is not in an unsafe or hazardous condition. Replacement or new equipment or wiring shall conform to the requirements of **[**N.J.A.C. 5:14A-7.21**]** **Chapter 12 of ASTM F 2291, as amended in N.J.A.C. 5:14A-7.2.**

i. (No change.)

2.- 3. (No change.)

5:14A-9.23 Fire prevention

(a) All rides manufactured after December 16, 2002 shall meet and be maintained in compliance with the requirements of N.J.A.C. 5:14A-7.14**]** **7.4.**

(b) Replacement materials shall comply with the flame retardancy requirements of N.J.A.C. **[**5:14A-7.14**]** **7.4.**

3/8/06